Thanks to the generosity of this donor, whose steadfast stewardship preserved our shared history, Friends were able to fully restore our Meeting House and renew hundreds of feet of historic masonry. Our Meeting House stands renewed - its walls and spirit restored for generations to come.

Schuylkill Friends Meeting Masonry Consultation

2 mo 8, 2016

I. Burial Ground Wall
II. Meeting House Foundation - Exterior
III. Meeting House Foundation - Interior
IV. Fireplace / Flue - Interior
V. Fireplace / Chimney – Exterior
VI. First Day School
VII. Additional Question for Andy

Kur located Andy, contacted him, and asked to meet for his opinion on the Meeting House's spalling masonry and the Portland cement used in its repointing. Erik and Kur met with Andy from about 11:00 AM to 1:30 PM. Andy a graduate of Williamson Free School of Mechanical Trades owns and operates Limeworks.us. He performed extensive masonry restoration for Meeting in 2001. He was quite proud of the work. Andy is available at <*removed for privacy*>.

Wall on N. Whitehorse Road in 2000	Wall on N. Whitehorse Road in 2000

I. Burial Ground Wall

Wall by FDS – Not sure why there is no cap. Missing mortar is a sign of moisture finding its way in and behind the mortar joints. Looks like moisture pouring out of gutter as there is more blown out mortar in that (sheltered) area.

Adding a kerf about ½" in from bottom outer edge of coping (like window sill) would stop water from flowing back towards wall.

Note:*A drip kerf explanation: http://www.garymkatz.com/Publications/Articles/BillRobinson/Water-runs-uphill.pdf*

East wall, lower (southern) portion where tree fell on coping. Could be recast, loose mortar chiseled out and repointed. Andy archived mixed ingredients and is willing to provide. If young tradesperson experiences difficulty, he is willing to assist.

Note: *Kur contacted Andy a few times requesting a copy of the mixed ingredients.*

East burial ground wall

Looking along wall from this point you can see mortar is different shades. It appears portions have absorbed moisture giving it a darker tone.

Ask Andy: *If using a durable sheet of flashing below the new cap could help keep moisture away from stones at seem of existing coping or if it cracks. The flashing could also have a drip edge to deflect water away from the wall. We did this as a termite barrier on plates before raising wood frame walls.*

Sealing cracks along top of coping. Sealants will separate. If using sealant, can make with linseed oil and lime. Longer lasting seal would be: cut out and insert lead T-caps over (another piece a lead?) or something- forgot the name. Something to occupy space.

Note: Excerpt regarding lead T-Cap from- *http://www.selfgrowth.com/articles/using-lead-flashing-and-lead-t-caps-for-the-weather-proofing-of-building-roofs-chimneys-and*

<snip>
T-Caps installed in caulked joints will reduce the size of the opening of a joint to be caulked to assure improved, long lasting leak free joints. The proper sized T-Cap is determined by measurement of the joint opening to be caulked plus maximum percentage of joint movement experienced plus 1/4 inch.
T-Caps are a soft lead strip which when set and bedded in caulking compound, forms a cap which assures a permanent elastic seal for any masonry joint. After installation, the surface oxidizes rapidly to a neutral grey which blends with the masonry.
<snip>
1. Top, side and cross joints of copings and balustrades. Extend from outer face, across the top of the coping and down parapet side.
2. All cross joints on cornices and belt courses. Carry down at least 1 inch on front face of stone, or down front face of stone to first change in contour as desired.
<snip>

Note: *T-cap applications and image: http://www.weathercap.net/UserFiles/File/CatalogNew.pdf*

Wet wall issue at seems near Outhouse (where new/repaired wall began). I forgot the issue- cracked or something else? He wanted to view exterior (Whitehorse Rd) side.

Exterior of west (Whitehorse Rd) side. Lower portion loss of mortar is due to moisture. This can come from splash back off of concrete base and soaking from grade on other side. It is better if the mortar pops out than stone shedding layers of sediment. This should be considered a "maintenance item". I.E. Every 10 or 15 years.

Note: *This seems unlikely, as we probably won't have the resources, and it's doubtful that future generations will maintain it every 10–15 years. However, if Meeting can acquire the mix ingredients, perhaps it could be done in-house?*

Looking down length of wall, it appears the mortar popping out issue travels a considerable distance. The black algae are from being beneath the trees.

From the tree area down to the corner has a good deal of mortar damage as well. Stones look like they may have been set during different time periods or from a different source. The number (ratio) of that red stone increases heading towards corner.

The excessive mortar damage does not appear to be from higher grade on inside since the portion traveling up to east wall (along development) is intact.

II. Meeting House Foundation Exterior:

By fireplace 2014	September 1999

Forgot the name Andy used for style (Fling?) of stucco finish he used on a Meeting House.Note: *Short article on lime-based stucco: http://www.buildingconservation.com/articles/stucco/stucco.htm*

Thought: *The stucco finish of Valley Friends Meeting might be less expensive? The color is very white. Is this done to be Quaker-like? Whatever color, stains (algae) will harm aesthetics (if flashing not done properly as seen in 1999 pictures of front). Algae may also appear on northern side (rear) as stucco is more porous allowing this growth. It may not be a problem since three mature trees (by outhouse, propane and the one fell on coping) are gone.*

He recommended removing the Portland cement mortar by chiseling it away. I asked if he does it by hand and he said he would use handheld power chisels. I forgot if he said they'd repoint then stucco or just stucco.

Thought: *Perhaps a combination of- handheld grinding wheel and chiseling by hand would be safer for stones?*

Note: *Search results for 'spalling wall': http://www.buildingconservation.com/search.php?q=spalling+wall&search.x=0&search.y=0*

Thoughts: *Andy mentioned replacing stone is not an option. Later (in cellar) he mentioned a technique where stone is removed and placed back in reverse. Kai Lambert (Kur's friend, a Township Engineer in Bexbach, Germany) said they used soft mortar on a centuries old church made of limestone. They are replacing individual stones when necessary. This sounded cost effective and might be an option if Friends prefer the stone look.*

Thought: *Would it help future generations to document the individual spalling stones? Kur took several photos of the masonry (taken in 2014-2015). We could create documentation for each side to "catalogue" the spalling. In 10- or 15-years Friends can revisit to see if additional stone are beginning to spall and then decide on taking additional action.*

Andy mentioned he often sees this type of damage (spalling) when the interior has been sealed (attempt to "waterproof"). Moisture has nowhere to go and is drawn out by sun taking a layer of sediment off the stone. Ballpark figure to chisel out pointing from 1999 and applying stucco finished used on ---- Meeting House is "less than $100,000.00".

Andy wrote in e-mail, *"When we arrived to repair the cemetery stone wall, the Meeting house had already been repointed in the hard Portland cement mortar. The building should most likely have a harled finish of lime render on the outside and not exposed stone. So, the right thing to do is to minimally remove the cement mortar and replace it with the right type of lime mortar."*

During the consultation Andy mentioned offering to remove the 1999 pointing and using high lime content mortar for donations. He did not know why Meeting did not accept the offer. Refer to recorded minutes of 12 mo. 9, 2001. It appears Meeting may not have been aware of the severity of the problem.

East wall by fireplace. Up to 1" deterioration from 1999 mortar joint – August 2014

III. Meeting House Foundation – Interior: This section is incomplete. (I.E. bulging area by water main has lost mortar joints)

Andy scratched mortar joint between door and front vent and said it was too hard. The Rack Guard (poured concrete) may have caused of the damaged stone on the lower portion by Social Room (west side). I think he said this does not allow the moisture through (similar to the sealing issue).
Note: *Rudy said they poured this Rack Guard to keep critters from boring through the dirt. There are some fair-sized piles of sediment on the perimeter (in crawl space). Kur took a video while working in basement. The video can be viewed at this URL:*
https://archive.org/details/CrawlSpaceInspectionOfSchuylkillFriendsMeetingHouse2016
It is about 18 minutes. You will see the sediment in the first 5 minutes.

IV. Fireplace / Flue – Interior: This section is incomplete

The inside of firebox could be redone. The cable for the flue damper/cap should be in a sleeve. This will increase its usefulness (last longer). Asked Andy- Would the heat from the firebox and an unventilated solid flue be accelerating stone spalling – like a cold glass of water on a hot day develops condensation? Quite possibly was his answer.

Note: *It looked like regular plaster was used in the outer edges. Portions of material have fallen off from the inside of the firebox.*

V. Fireplace / Chimney - Exterior:

Counter flashing is either beneath the stucco or they used stucco to counter along the roof. Possibly stucco over counter flashing to deal with water leak 10 years ago. This should be re-countered properly. Lead covered copper most authentic, then copper (which oxidizes). Note: *Should be fine (and cost effective) using standard (brown) aluminum and match it along edge of roof when roof is redone.*

Note: *There is no cricket (from higher side of chimney back into roof). Brief explanation of cricket:*
https://en.wikipedia.org/wiki/Cricket_(roofing)
Note: *It should be more cost effective if this is done with roofing.*

Andy feels there is no need to a cap chimney. The top mount flue damper is a cap (if installed correctly). Here are some examples along with cable shielding Andy mentioned:
http://www.woodlanddirect.com/Chimney/Top-Sealing-Chimney-Dampers/?state=20711

Andy suggested there sounded like hollow areas on either side of the flue (above firebox). Generally, solid flues fill in an area between a "bladder" and the interior of an existing flue; with voids in existing flue filled. Between the outer portion of the existing (original) flue and outer shell there is an air gap. This is to allow for movement (expansion and contraction) of the materials. Sometimes air gaps are left as a void which precipitates moisture buildup. This moisture soaks into the stone and works its way out of the stone. This causes layer sediment to be shed from the outer portion of the stone. Andy suggested exploratory work – remove the crown (thin mortar type mix troweled on top of chimney) to see if there is an air gap between solid flue and outer shell. If so, fill in with a material (Perlite, Vermiculite or Leca) which will stop the air circulating (from extreme change of temperature). This insulating material and can be removed in the future.

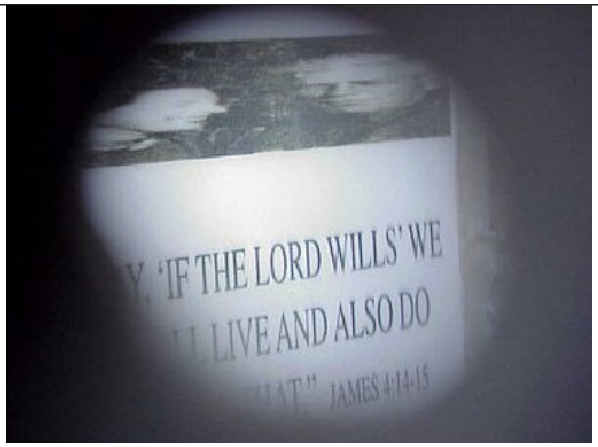
Note: *Kur did a quick check and did not hear the hollowness but as I knocked on the wall Erik thought it could be hollow. Try again to confirm this is not due to the change in wall plaster (where it begins to curve). Having no gap between solid flue and stone masonry could be accelerating stone spalling.*

Note: *The expense of this exploration may not be worth it since it only checks area between flue and outer shell. There is no visible evidence of an issue with outer shell (on chimney above roof) since solid flue was installed. The issue is the masonry outside of the building and the exploration does not address the area between outer shell and masonry on outside of building. Perhaps we could simply get on a ladder to check:*
The flue damper is sealing well.
The crown is solid (no crack allowing moisture in).

Note: *Further reading on moisture and flue lining here:*
http://www.buildingconservation.com/articles/services/chimney.htm

VI. First Day School:

Andy also restored the pointing of the FDS at cost. The western portion was originally a horse shed. He was concerned about the gutter functionality and it's spilling on the burial ground wall on the east end.

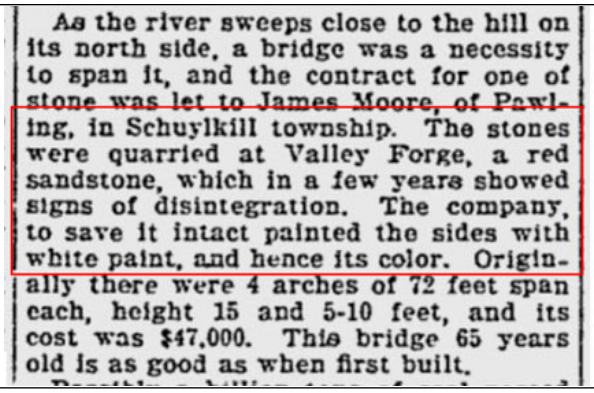
	
First Day School in 2000	Stainless steel plaque. "The anamorphic projection challenges viewers to understand that what is not quickly evident in a photo or in all of life, begins to make sense when we take the time to study it from every angle. This is my quiet, perpetual tribute to the benefactor and to the Quakers." –Andy

During 2015, Kur mentioned the spalling masonry. Harris and Rudy suggested the Meeting House may not have had a stucco finish until spalling masonry was detected. Kur agreed, noting that images of the building from the 1990's appear to show a modern (20th-century type) stucco mix. However, he suggested that spalling could have been visible at the time the stucco was removed.

Kur also mentioned that he had whitewashed a few old buildings in Fairmount Park using hydrated lime, describing the method as cost-effective and typically lasting about 5-7 years. An image of the Meeting House from 1897 shows the building was white, though Kur could not determine whether it was a whitewash, plaster or stucco. Stucco was considered prestigious during the early part of the 19th century, when the building was originally constructed and later expanded.

Kur mentioned that the historic buildings he worked on were repointed using a soft, flexible lime mortar. He did not mention that Portland cement had been improperly used in 1999, which likely contributed to the spalling he noticed in 2012.

Note: *More on Pointing*
https://www.spab.org.uk/advice/inappropriate-cement-pointing
https://jeffersonmatters.org/wp-content/uploads/2012/09/Masonry-repointing-right.pdf



As the river sweeps close to the hill on its north side, a bridge was a necessity to span it, and the contract for one of stone was let to James Moore, of Pawling, in Schuylkill township. The stones were quarried at Valley Forge, a red sandstone, which in a few years showed signs of disintegration. The company, to save it intact painted the sides with white paint, and hence its color. Originally there were 4 arches of 72 feet span each, height 15 and 5-10 feet, and its cost was $47,000. This bridge 65 years old is as good as when first built.

Reading Eagle Newspaper article from
January 10, 1903

Additional Questions for Andy:
What was the name of the vermiculite type material used to fill air gap between solid flue and masonry?
What did you call the style of (stucco type) finish you recommended?
What was the name of the Meeting House you applied this finish too?
May we have a copy of the mix (recipe) used to point burial ground wall and First Day School?
What type of material should be used in firebox and along outer corners? What is a ballpark cost?
Can a Mantel be incorporated above firebox to reduce black carbon marks? *Would it be more cost effective to budget to paint instead?*

Kur B.